

FMC-40 Controller

Wiring And Alignment Guide



FMC-40 Wiring And Alignment Guide

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Important!

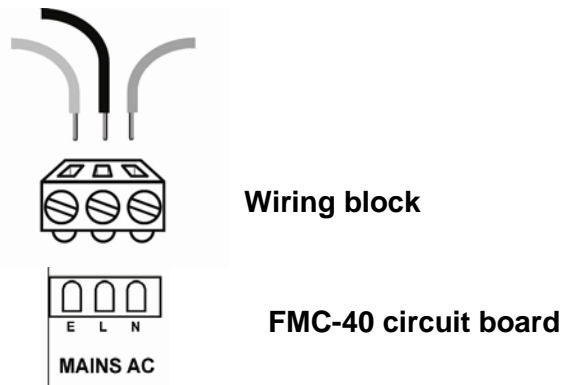
Consult the FMC-40 User's Guide for operational information. This guide is not intended as an operational guide. It is intended only for installation and alignment. If you do not have a copy of the FMC-40 User's Guide, it is available in PDF form from the RAE Systems website at www.raesystems.com.

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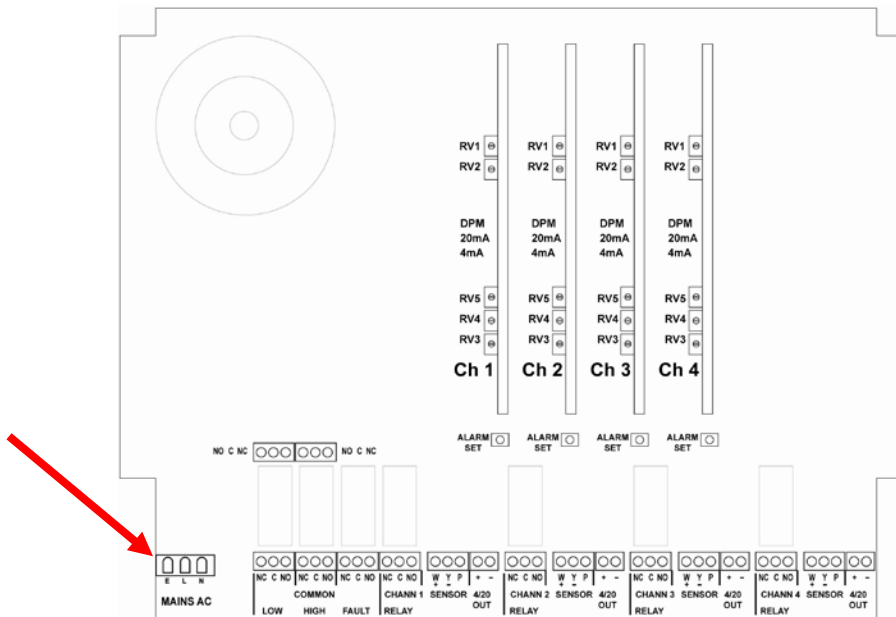
1. Wire The FMC-40 For AC Power

Connect power wires from an AC source to the 3-pole power block. Slip the stripped end of each wire into the receptacle on the block and tighten its screw. Connect as follows:

Label:	E	L	N
Meaning:	Earth	Live	Neutral
AC wires:	Ground	Hot	Neutral



Here is the location of the AC power receptacle on the main PC board:



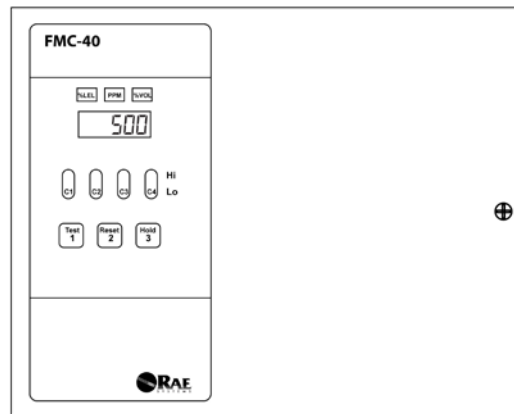
Note: Refer to the FMC-40 user's manual for other configurations.

Once the block is wired for AC power, plug the block into its mating receptacle on the PC board.

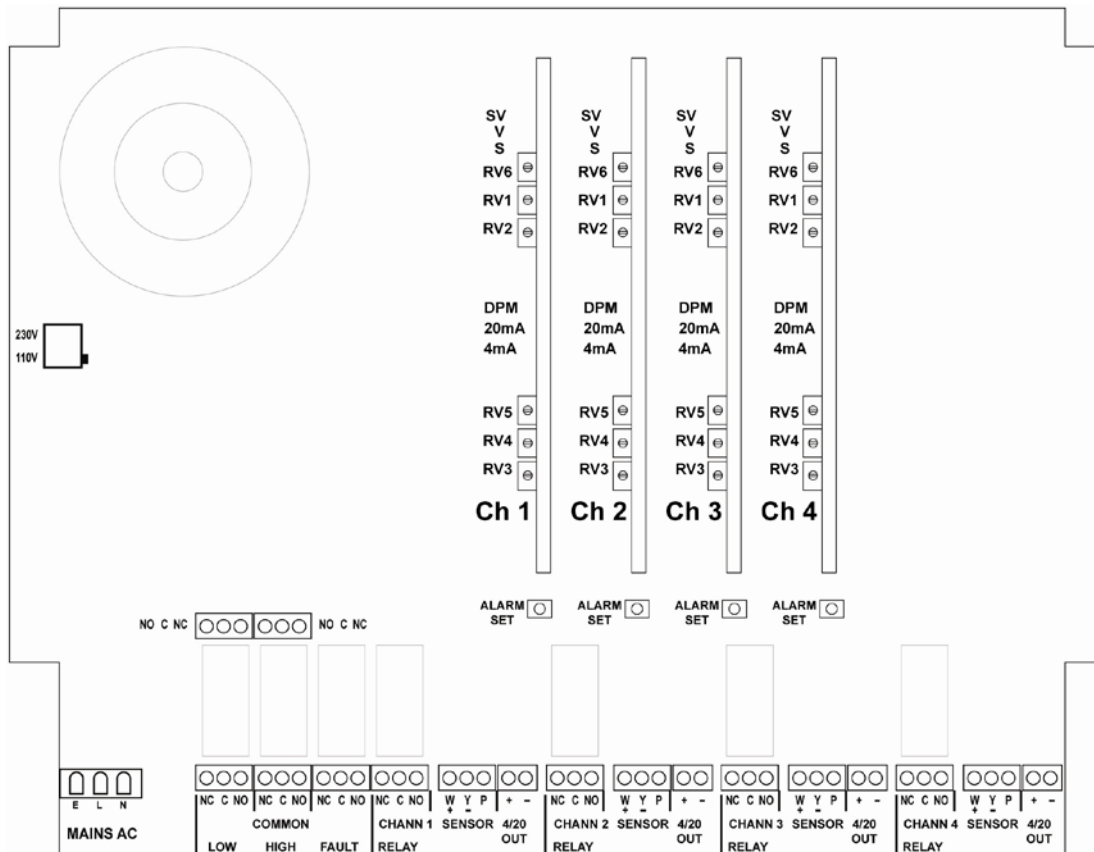
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2. Wire the FMC-40 To The RAEGuard Or Other Sensor Head

Open the FMC-40 by loosening the Philips screw on the right side of the front panel and opening the top like a door.

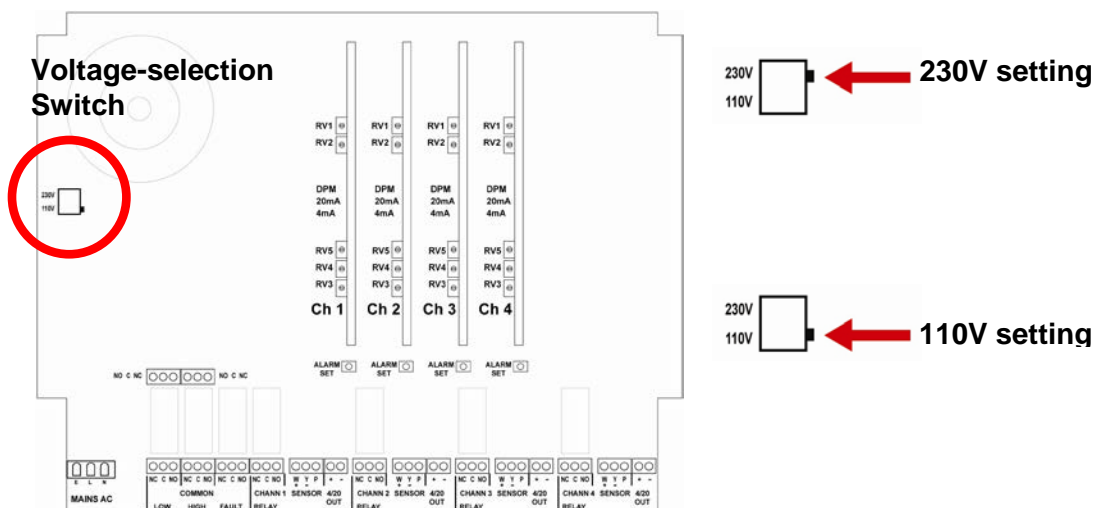


The printed circuit board with all four channel Alarm Cards and all connection points is now visible:



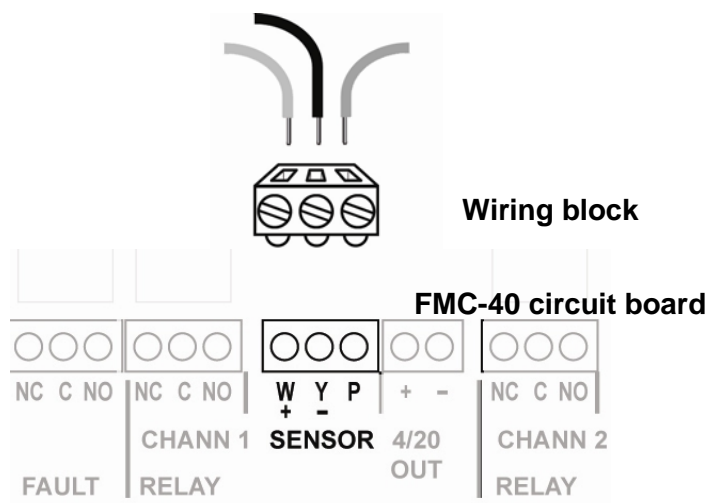
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Set the appropriate operating voltage for your region by sliding the voltage-selection switch on the far left side of the PC board. Your choices are 230VAC and 110VAC.



Connect three wires from the sensor head to the points labeled P Y W in the following way (note that if you are using a RAEGuard, you can follow the color scheme):

FMC-40 Label	Sensor Wire	RAEGuard Wire
W	Positive (+) supply	Red
Y	4-20mA signal output	Blue
P	Negative (-) supply	Black



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3. Alignment Procedure

Important! Calibrate all sensors before aligning the FMC-40 Controller.

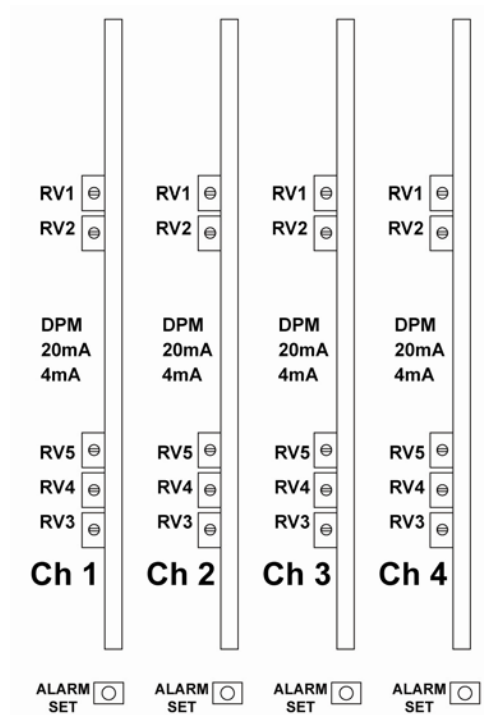
With all wiring completed, begin the alignment procedure.

Note: There are four channels, each with its own Alarm Card. Therefore, you will need to perform this alignment procedure for each board individually.

You will need the following tools:

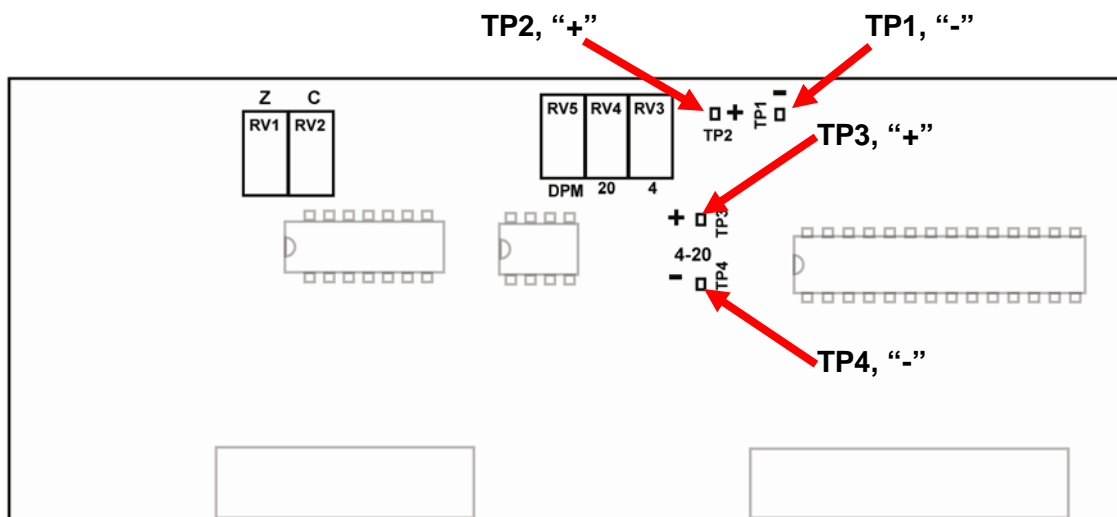
- Plastic alignment tool (recommended) or fine flathead screwdriver such as a jeweler's screwdriver
- DVM (digital voltmeter)

The FMC-40 should be open with the main PC board fully exposed. All four channels' Alarm Cards are standing in their sockets, numbered Channel 1 through Channel 4 (labeled Ch1, Ch2, Ch3, and Ch4), left to right.



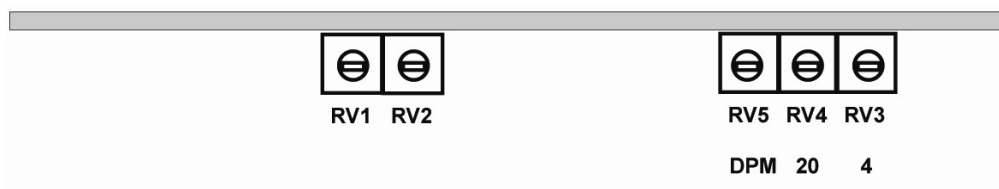
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The potentiometers on each Alarm Card is easy to find (RV1 through RV5), but the test points that must be accessed are less obviously located, especially when the PC boards are standing in their slots. A view from the top of each Alarm Card shows where the test points are found:



During all of the procedures, connect the probes to the test points. Make sure all PC boards are seated in their slots. The potentiometers are easy to access: They are on the edge of each Alarm Card.

Edge view of one Alarm Card PC board:



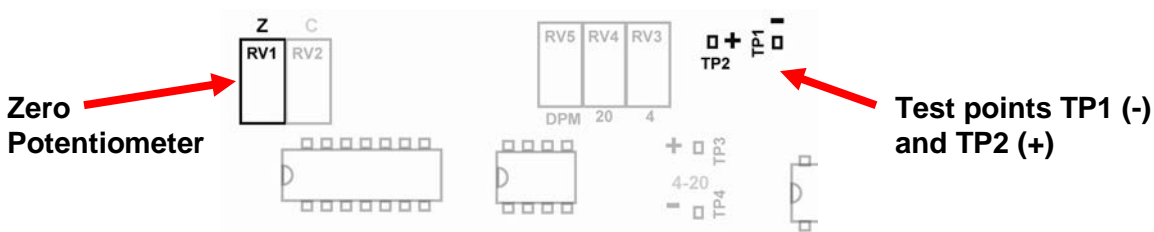
3.1. Set Digital Display Full-Range

Important! Before applying power to the controller, connect all sensor heads to the selected channel.

1. Apply power to the FMC-40.
2. Use an alignment tool to adjust the Zero potentiometer (RV1, located on Alarm Card) so that the FMC-40's display reads 000 (or 20.9 for oxygen sensors).
3. Turn on the DVM.

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4. Connect the “-” (black) probe from the DVM to the test point labeled TP1.
5. Connect the “+” (red) probe from the DVM to the test point on the PC board labeled TP2.



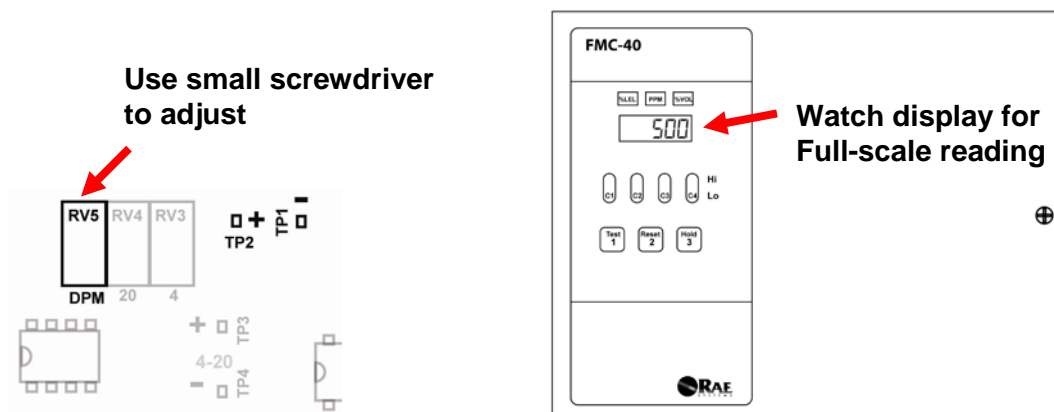
6. While monitoring the display on the DVM, use the alignment tool to turn the potentiometer labeled Zero on the Alarm Card until the DVM reading is 0.5 volts.

Note: Turning clockwise increases the value, while turning counterclockwise decreases it.

3.2. Set Full-Scale Maximum Value

Now set the full-scale maximum value to match your sensor head's maximum output.

Use the screwdriver to turn the screw on the board-mounted potentiometer labeled DPM (RV5) while watching the display on the front of the FMC-40.



Adjust it until the value shown in the FMC-40's display reads the same as the full-scale output of the sensor head (for example, 1000, 500, 20, etc.).

Note: Turning clockwise increases the value, while turning counterclockwise decreases it.

Disconnect the DVM's probes from the test points.

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3.3. Set High/Low Alarm Thresholds

1. Adjust the sensor output to read 000 (or 20.9 for oxygen sensors).
2. Press and hold the FMC-40 Alarm set button on the circuit board until the Low alarm LED glows on the FMC-40's front panel.
3. When the Low LED glows, release the switch.

Note: Establish low and high alarm thresholds you want from the sensor head (such as 20, 500, etc.).

3.4. Low Set

1. Adjust the Zero potentiometer until the FMC-40's display shows the low alarm value (such as 200).
2. Press the Alarm Set button once, and the high alarm LED should glow.

3.5. High Set

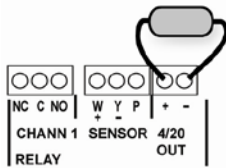
Adjust the Zero potentiometer until the FMC-40's display shows the high alarm value (such as 500).

3.6. Normalize Settings

1. Press the Alarm set button. Both the High and Low LEDs should glow.
2. Adjust the Zero potentiometer to show 000 in the FMC-40 display (or 20.9 for an oxygen sensor).
3. Press the Alarm set button again, and alarm LEDs should turn off.

3.7. Adjust The 4-20mA Range-Scale

1. Connect a 100- to 250-ohm resistor to the 4-20mA output points on one of the four alarm cards. (Each of the alarm cards must be adjusted separately.)



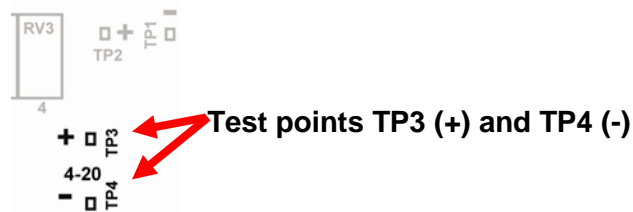
2. Set the sensor head to output 4mA.

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3. Locate the Zero potentiometer on the Alarm Card. Adjust the Zero potentiometer until the FMC-40's display reads "000."

Note: Turning clockwise increases the value, while turning counterclockwise decreases it.

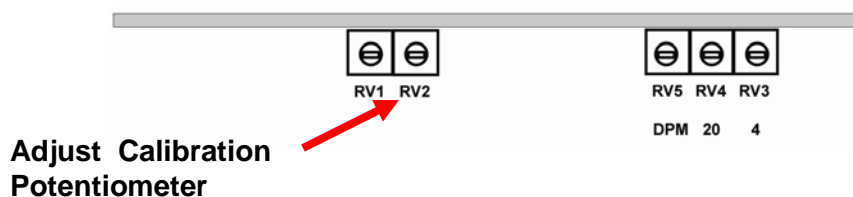
4. Connect the "+" (red) probe from the DVM to the test point on the PC board labeled TP3.
5. Connect the "-" (black) probe from the DVM to the test point labeled TP4.



6. Turn the screw on the PC-board-mounted pot labeled "4mA" (RV3) and monitor the DVM.



7. When it reads 4mV (or 0.004 volts), it is set correctly.
8. Set the sensor output to deliver 20mA.
9. Turn the Cal Span potentiometer (RV2) until the FMC-40 display reads a value matching the sensor's full-scale value (such as 1000 or 20, etc.).



10. Make sure the DVM shows 20mV. If it does not show 20mV, adjust the potentiometer labeled "20mA" (RV4) until the DVM displays 20mV.
11. Disconnect the DVM's probes from the test points.
12. Remove the resistor from the 4-20mA output points.

Alignment is complete.

Important! Make sure to test the system with calibration gas before monitoring.

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